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The Facilities of the Institute

The Institute is ideally located for its experimental work. Immediately adjacent to it is the Hugo Sauer Nursery, operated by the Wisconsin Conservation Department in cooperation with the U.S. Forest Service and producing 7 to 9 million young trees each year for forest planting. It offers excellent facilities for observing early survival and growth of experimental stock.

Through interested cooperators, all the forests of the Lake States regardless of ownership provide a source of material from trees with superior or unusual characteristics. Outplanting areas for progeny tests have been reserved in all of the National Forests of the region, including the adjacent Nicolet and Chequamegon Forests.

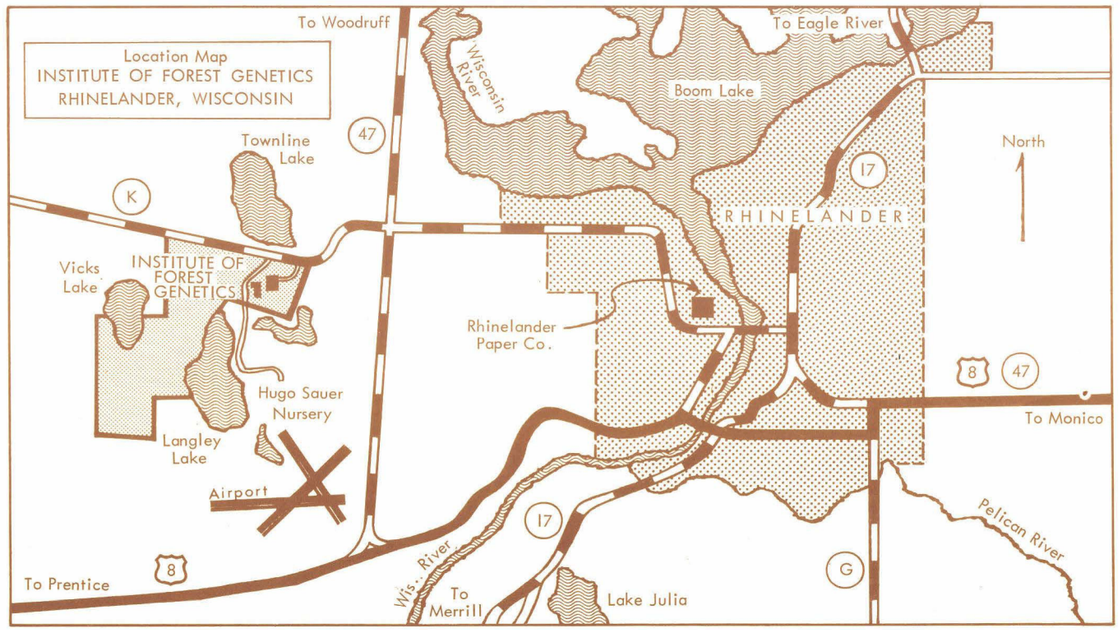
The Institute occupies a new 8,000-square-foot laboratory building. This building has space and equipment for an eventual staff of 10 scientists. It includes four controlled-environment rooms, an excellent library where literature on tree genetics and physiology is being assembled, and adequate offices. Facilities are available for tissue culture and auxin bioassays. Pollen is handled in specially constructed rooms with temperature and humidity control.

Supplementing this main building is a modern, fully automatic greenhouse covering 2,400 square feet, and an attached headhouse and office laboratory. Nearby is sufficient lath house and coldframe space for present needs.

The Institute is a field project of the Lake States Forest Experiment Station, whose headquarters are maintained in St. Paul, Minn., in cooperation with the University of Minnesota.

Results of studies, as they become available, are reported by the Station in a series of Research Notes and Research Papers. More comprehensive reports are published in scientific and professional journals or as special bulletins.

Between 1957, when the Institute was established, and January 1963, about 40 technical and 20 nontechnical articles were published on the work of the Institute. Copies of these and of other reports by the Station staff may be obtained by writing to the Director, Lake States Forest Experiment Station, St. Paul Campus, University of Minnesota, St. Paul 1, Minn.



LAKE STATES FOREST EXPERIMENT STATION

Institute of Forest Genetics

Rhinelander, Wisconsin

A facility of the

FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE

A superior white spruce tree selected for study.

The Institute of Forest Genetics at Rhinelander, Wis., was established in 1957 by the U.S. Forest Service. Since that time a staff of scientists has been conducting research here to improve the heritable quality of planting stock of the northern conifer and hardwood species. This research seeks to clarify the basic genetic and associated physiological processes of the trees and the factors that determine their resistance to diseases and insects. The studies have great economic significance because, through the genetic improvement of growing stock, it is possible to multiply the value of timber yields several times.

Genetics is the study of inheritance. In forestry it seeks to account for the similarities and differences shown by trees that are related. These variations in spruces, pines, and hardwoods are being studied at the Institute. Trees are selected from native stands for superiority in growth or quality or for unusual characteristics. Their progenies are tested and analyzed. Grafting and cross-pollination are used to provide plants with identical genetic makeup or to try to find out how the characteristics under test evolved and how they are transmitted. Exotics are introduced and tested to determine the contribution they may be able to make to tree improvement.

Some of the tests concern the inheritance pattern of tree characteristics that determine adaptation to particular conditions of soil, moisture, temperature, wind and day length. For example, drought and frost resistance are of particular importance in species for windbreak planting in the Northern Plains.

Other tests delve into the factors of quality – fiber length, branch distribution and size, percent summerwood, and structure of the grain. New studies now underway concern the effects of radiation on trees; these may clear up questions about tree evolution, and through inducing genetic changes, result in valuable new types of trees. Studies are in progress to determine the physiological bases for successful vegetative propagation of forest trees.

Test plants such as these white spruce grafts may spend a period of growth in the partial shade of the lath house.

The Institute is equipped with some of the most modern laboratory equipment available. The scientists have ample laboratory and study space, as well as controlled environment rooms, cold frames, a lath house, and a greenhouse complex.

Hardwood seedlings responding dramatically to applications of a growth hormone.

Physiology of flowering and growth is studied to provide new tools for genetics research and to clarify the growth processes fundamental to a fuller understanding of inheritance. Knowledge of the physiological processes – such as growth-hormone relationships – that control tree-quality characteristics enables the geneticist to select for such characteristics with greater confidence. It may also reduce the period needed for testing progenies from selected trees. An increase in our understanding of flowering and root development will greatly increase the efficiency of genetics research. A Pioneering Research Unit was established at the Institute in 1962 by the U.S.D.A. The Unit's assignment is the fundamental study of wood formation in trees.

Insect and disease resistance is an essential characteristic of improved types of forest trees. Rapid growth, good form, and superior quality of wood are of little significance if the trees are damaged by pests and diseases. The question here is: Why do some trees resist insects and diseases better than others of the same species? The explanation may be in the chemical composition of the bark or wood of the trees, or in a unique cycle of annual growth and flowering, or in the presence of protective tissue. Physiology of the insect or disease organism may provide the clue.

Dr. Philip Larson, head of the Pioneer Research Unit, measures the growth of young trees in one of the Institute's controlled environment rooms.

The Institute's senior project leader, Dr. Hans Nienstaedt, pollinates black spruce. Controlled pollination assures progeny from selected parent stock.